

REMARKS

This Amendment is in response to the Final Office Action entered in the above identified case and mailed on March 29, 2004. Claims 1 to 53 are pending. Claims 10 to 27 and 31 to 53 have been withdrawn. Claims 1 to 9 and 28 to 30 stand rejected. In this Amendment, claims 1 and 28 have been amended. It is believed that no fee is due in connection with this Amendment, however, please charge Deposit Account No. 02-1818 for any fees owed.

In the Office Action, the specification was objected to under 35 U.S.C. § 112, first paragraph. Claims 1 to 7, 9 and 28 to 30 were rejected under 35 U.S.C. § 103 as being obvious in view of U.S. Patent No. 4,661,246 to Ash ("*Ash*") and WO 01/35057 A2 to Khalil ("*Khalil*"). Claim 8 was rejected under 35 U.S.C. § 103 as being obvious in view of *Ash*, *Khalil* and U.S. Patent No. 4,350,660 to Robinson et al. ("*Robinson*").

Regarding the objection to the specification, Applicants respectfully traverse the objection. Applicants believe that one skilled in the art can readily practice the claimed invention based on what is disclosed in the specification and that the specification, albeit providing alternative embodiments, does set forth embodiments that (i) support the claims and (ii) are clear and concise. That is, the fact that Applicants have endeavored to support their claims in multiple ways with multiple embodiments does not provide proper grounds for potentially barring Applicants from obtaining patent protection for their invention, which they have chosen to disclose publicly. To hold otherwise would promote less disclosure, which is contrary to the public policy underlying the patent system. Moreover, a large precedent exists for allowing patent applications to disclose multiple embodiments for practicing the invention and to reverse course now is highly unfair to Applicants.

Furthermore, to a large extent the objection is moot because the claims at issue are directed to an ammonia sensor. The Office Action at the top of Page 2 concedes that the specification is understood to disclose an ammonia sensor. The fact that the Patent Office may be confused as to other subject matter disclosed in the specification seems unimportant here considering an ammonia sensor is claimed and is clearly and concisely supported by the specification. In particular, Claim 1 claims "a sensor for sensing ammonia in a fluid, comprising: a fluid flow path having an optical window; a membrane positioned within the fluid flow path, the membrane exhibiting a color indicative of the concentration of the ammonia in the fluid; and an optical reader positioned outside of the fluid flow path that can identify the color of

the membrane through the optical window, the optical reader including an infrared emitter, a color emitter and a photo-detector.” Each of the elements of claim 1 is supported in the specification in full, clear, concise, and exact terms thereby enabling any person skilled in the art to make and use the invention.

For example, and not by way of limitation, the specification at page 11, lines 21 to 30 describes that the present invention relates to an ammonia and ammonium sensor for aqueous solution and also describes the components necessary, including an optical window, optical indicator, a flow path, and an optical reader. “The optical indicator 12 is positioned within a fluid flow path 16 ... in direct contact with the fluid in the flow path 16.” The specification continues at page 12, lines 8 to 10 to explaining that in a preferred embodiment, the optical indicator is a “membrane which changes color in relationship to changes in the concentration of the component to be measured in the fluid.”

The specification also clearly and fully describes the optical reader and its functionality. For example, the specification at page 12 lines 17 to 27 describes that “the optical reader 14 detects or reads the optical indication of the optical indicator 12 ... is positioned in a reading relationship with respect to the optical indicator 12, and is preferably positioned outside of the fluid path 16.”

Furthermore, the specification clearly and fully teaches a control circuit for the sensor. The specification at page 15 lines 17 to 30 enables the control circuit for the sensor and states “the sensor 10 is computer controlled by the control circuit 34 which provides driving signals to the LED’s 26, 28, 30 to send light signals toward the hydrophobic membrane.” Further still, the specification and drawings describe an example timing scheme for providing the driving signals. For example, Figure 4, and the specification at page 16 lines 1 to 27 describes how to control the sensor’s optical reader by providing driving signals in a multiplexing and demultiplexing mode.

Although there are variations disclosed for the optical indicator, the optical reader, the use of such a sensor in a dialysis system, the use of pH adjuster or pH conditioner, and the possibility of including additional sensors to be utilized and controlled by the control circuit, the specification clearly enables one skilled in the art to make and use the present invention as it relates to claims 1 to 9 and 28 to 30. That is, the variations do not nullify or make less clear the primary embodiments disclosed in the present invention. The figures serve to further clarify and bolster the written description.

Regarding the comments in the Office Action relating to the European Patent Examiner and the PCT application, Applicants wish to clarify that the comments were directed towards performing a search for prior art, and not whether the specification contains full, clear and concise disclosures, enabling one skilled in the art to make or use the invention. The European Examiner only remarked that the application discloses a large number of options and variables, making a meaningful search with the resources available difficult. In this case, the Patent Office has rectified any searching burdens by restricting out 42 of the originally filed 53 claims. For each of the above-described reasons, Applicants respectfully request that the Examiner reconsider the § 112 objection to the specification.

Regarding the rejection of claims 1 to 9 and 28 to 30 under *Ash* and *Khalil*, Claim 1 has been amended to specify that the optical reader includes an infrared emitter, a color emitter and a photo-detector. Similarly Claim 28 has been amended to specify that the membrane reader includes an infrared emitter, a color emitter and a photo-detector. None of the art of record teaches the use of an infrared emitter that provides measurements for comparison against signals from another emitter. Furthermore, the combination of an infrared emitter and a color emitter is advantageous as supported by the specification at page 16 lines 15 to 27. None of the art of record alone or in combination teaches or suggests such advantageous combination.

Applicants assert that the teachings of *Khalil* are not readily combined with a reference merely disclosing an infrared emitter because in *Khalil* the sensor is located at the membrane. *Khalil* at page 5 lines 27 to 35 provides that the optical reader is connected and mechanically fixed to the membrane via heat-shrink tubing thereby allowing physical protection of the membrane, and isolation from liquid mediums. The combination claimed in claim 1 is not needed in *Khalil*. *Khalil* is not therefore suggestive of such a combination.

Ash is directed towards placing the optical indicator (strip) in the fluid path, and is further directed towards isolating and separating the optical reader from the optical indicator. *Ash* therefore teaches away from *Khalil*. It would not be obvious to use *Khalil* and *Ash* in combination. Furthermore, neither *Khalil* nor *Ash* discloses, teaches or suggests, alone or in combination, an infrared emitter or an infrared emitter in combination with a color emitter as included in the present claims.

Robinson does not cure the deficiencies of *Khalil* and *Ash*. *Robinson* does not disclose an "infrared emitter for calibrating ammonia gas background" as alleged in the Office Action at

page 5. *Robinson* discloses rather a copper phthalocyanine sensor whose electrical resistance changes as it is exposed to ammonia gas. In order to test the copper phthalocyanine sensor, *Robinson* provides that the copper phthalocyanine sensor's results were compared to the amount of ammonia gas introduced into the enclosure housing as measured by an infrared gas analyzer (col 2., lines 6 to 9). The *Robinson* analyzer is used to ensure that the sensor output accurately represents the actual amount of gas in the enclosure. *Robinson* does not teach or suggest an optical reader that includes an infrared emitter. Indeed, it would be non-sensible to use an infrared emitter in *Robinson* because *Robinson* provides no optical indicator to read.

Claim 8 has been amended merely to comport with the amended language of claim 1.

For at least the above-described reasons, Applicants respectfully submit that claims 1 and 28 and claims 2 to 9 and 29 to 30 that depend from claims 1 and 28 are patentably distinct and in condition for allowance. Applicants earnestly solicit reconsideration of the present claims.

Respectfully submitted,

BELL, BOYD & LLOYD LLC

BY 

Robert W. Connors
Reg. No. 46,639
P.O. Box 1135
Chicago, Illinois 60690-1135
Phone: (312) 807-4204

Dated: June 29, 2004